

Math 1060 – Exam 2 Review

Use identities to simplify each expression:

1. $\frac{\tan x \csc x}{\sec x}$

2. $\tan^2 x - \frac{\sin(-x)}{\sin x}$

Multiply and simplify:

3. $\sin \theta \cos \theta (\tan \theta + \cot \theta)$

Factor and simplify:

4. $\sin^2 x \tan^2 x + \sin^2 x$

Verify each identity:

5. $\frac{\sin x \cos x}{\tan x} = 1 - \sin^2 x$

6. $\cot(-x) = \frac{1 - \sin^2 x}{\cos(-x) \sin(-x)}$

7. $\frac{\sin 2\beta}{2 \csc \beta} = \sin^2 \beta \cos \beta$

8. $\frac{1}{\sec \theta - 1} - \frac{1}{\sec \theta + 1} = 2 \cot^2 \theta$

9. $\cos(3x) = \cos x (1 - 4 \sin^2 x)$

10. $\sin^2\left(\frac{x}{2}\right) = \frac{\csc^2 x - \cot^2 x}{2 \csc^2 x + 2 \csc x \cot x}$

Use identities to find the exact values of the remaining five trigonometric functions at α .

11. $\cos \alpha = \frac{1}{\sqrt{5}}$ and α is in quadrant IV.

Find the exact value by using a sum or difference identity:

12. $\cos\left(\frac{7\pi}{12}\right)$

13. $\sin\left(\frac{\pi}{12}\right)$

14. $\tan(165^\circ)$

Use the sum/difference identities to simplify each expression.

15. $\cos 75^\circ \cos 60^\circ - \sin 75^\circ \sin 60^\circ$

16. $\sin 80^\circ \cos 50^\circ - \cos 80^\circ \sin 50^\circ$

17. Find $\sin(A + B)$ if $\sin A = -5/13$ and $\cos B = 2/5$, with A in quadrant III and B in quadrant I.

18. Find $\cos(\alpha - \beta)$ if $\sin \alpha = 15/17$ and $\sin(\beta) = -1/3$, with α in quadrant II and β in quadrant IV.

Find the exact value by using a half-angle identity.

19. $\sin\left(-\frac{\pi}{8}\right)$

20. $\tan\left(\frac{3\pi}{8}\right)$

Use the given information to find the exact value of the trigonometric function.

21. Find $\cos\left(\frac{\alpha}{2}\right)$ if $\cos \alpha = \frac{1}{4}$, and α is in quadrant IV.

22. Find $\sin(2\theta)$ if $\sin(\theta) = \frac{5}{13}$, and θ is in quadrant II.

Find the exact value without using a calculator.

23. $\cos^{-1}\left(-\frac{1}{2}\right)$

24. $\arctan(1)$

25. $\sec^{-1}\left(\frac{2\sqrt{3}}{3}\right)$

Find the exact value in degrees without using a calculator.

26. $\csc^{-1}(-\sqrt{2})$

27. $\arcsin\left(\frac{1}{2}\right)$

28. $\cot^{-1}(-\sqrt{3})$

Find the approximate value using a calculator.

29. $\sec^{-1}(-1.5643)$

Find all values for x in the interval $[0, 2\pi]$ that satisfy the equation.

30. $\tan(x) = \sqrt{3}$

Find the exact value of the composition.

31. $\csc\left(\cos^{-1}\left(\frac{5}{13}\right)\right)$

32. $\cos\left(\arctan\left(\frac{8}{15}\right)\right)$

Find an equivalent algebraic expression for the composition.

33. $\tan(\arccos(x))$

34. $\sec(\arcsin(x))$

Find the acute angle θ , to the nearest hundredth of a degree for the given function value.

35. $\csc \theta = 6.354$

36. $\sec \theta = 4.321$

Find all real numbers that satisfy the equation.

37. $2\cos x + \sqrt{3} = 0$

Find all real numbers in the interval $[0, 2\pi)$ that satisfy the equation.

38. $\sqrt{2}\sin(3x) = 1$

Find all real numbers that satisfy the equation.

39. $2\cos^2 x = \cos x$

Find all angles in the interval $[0^\circ, 360^\circ)$ that satisfy the equation.

40. $2\sin x \cos x = 1$